

Phebalium distans P.I.Forst. (Rutaceae), a new and endangered species from south-eastern Queensland, and reinstatement of *P. longifolium* S.T.Blake

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Summary

Forster, Paul I. *Phebalium distans* P.I.Forst. (Rutaceae), a new and endangered species from south-eastern Queensland, and reinstatement of *P. longifolium* S.T.Blake. *Austrobaileya* 6(3): 437–444 (2003). *Phebalium distans* P.I.Forst. is named as a new species and distinguished from *P. longifolium* S.T.Blake (newly resurrected at specific rank) and *P. squamulosum* Vent. It is known from ten extant populations in small remnants of semi-evergreen vine thickets in south-eastern Queensland and is considered as endangered due to the low number of populations with few individuals. Both *P. distans* and *P. longifolium* are described and illustrated. A key to the species of *Phebalium* in Queensland is provided.

Key words: *Phebalium*, *Phebalium distans*, *Phebalium longifolium*, *Phebalium squamulosum*, Queensland – flora

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Introduction

A revision of the species of *Phebalium* Vent. occurring in Queensland was provided by Wilson (1970) as part of his overall account of the genus in Australia. More recently he (Wilson 1998) revisited this genus and transferred a number of species into the allied genera *Leionema* (F.Muell.) Paul G. Wilson, *Nematolepis* Turcz. and *Rhadinothamnus* Paul G. Wilson. This new circumscription of *Phebalium* meant that the genus consisted of c. 25 species with 5 species recognised to occur in Queensland (Forster 2002).

Wilson (1970) considered that some of the “species” of *Phebalium* comprised complexes of subspecies that were markedly disjunct, both ecologically and geographically. This was particularly the case with the taxa included under *P. squamulosum* Vent. and he recognised some ten subspecies for this species. Three of these proposed subspecies, *P. squamulosum* subsp. *squamulosum*, *P. squamulosum* subsp. *longifolium* (S.T.Blake) Paul G. Wilson and *P. squamulosum* subsp. *gracile* Paul G. Wilson have been recognised for Queensland (Ross 1983, 1994; Forster 1997, 2002). It is generally considered that subspecies should differ in only

a few characters and that intermediate populations should exist to demonstrate continuity of character states (e.g. Stebbins (1950) states “subspecies....connected....by a series of intergrading forms” or Stace (1989) states “a population of several biotypes forming a more or less distinct regional facies of a species.....a geographical race, ecotype, topodeme or genoecodeme”). This does not seem to be the case for some of the taxa included in *P. squamulosum*, at least in Queensland, where no obvious intermediates exist, there are clear character state differences and the taxa are markedly allopatric. Bruyns (2002) has provided a succinct species concept in “species are generally taken....as groups of populations that differ in at least two persistent, “good” characters” and subspecies are “geographically complementary taxa that differ in only one “reasonably reliable” character”. This has always, and continues to be, the approach that I have taken in the delimitation of taxa and these species and subspecies concepts are applied herein. This species concept equates broadly with the ‘diagnostic species concept’ of Judd *et al.* (2002).

In the current paper, a narrower circumscription for *Phebalium squamulosum* is advocated with *P. squamulosum* subsp.

longifolium reinstated to species rank as *P. longifolium* S.T.Blake as listed in Forster (2002). In addition, one new species (*P. distans*) in this complex is described. These three species differ in more than three character states one from another. The morphological characters that form the discontinuities in this group of taxa are easily discernible and include habit (shrub or tree), the form and composition of indumentum (stellate trichomes, lepidote scales), whether the branchlets are glandular-tuberculate, the shape of the leaf lamina and especially the length/width ratio, the form of the leaf margin (flat or recurved), whether the calyx is glandular-tubercular, corolla size, shape and colour and seed size. All of the taxa thus delimited are markedly allopatric, with the northern *P. longifolium* having the greatest disjunction from the others.

Materials & Methods

This paper is based on collections in the Queensland Herbarium (BRI) augmented by field observations and collections by the author in Queensland and northern New South Wales. Floral descriptions are based on material preserved in spirit or by reconstitution in boiling water. A full description of *P. longifolium* is provided for comparative purposes.

Taxonomy

Phebalium distans P.I.Forst. **sp. nov.** a *P. squamuloso* subsp. *squamuloso* habitu arboris (non fruticos), lamina folii lineari (anguste oblanceolata usque anguste elliptica comparate), ratione longitudinis /latitudinis 7.7–15.5 (non 4.2–6.6), margine recurvata (plana comparate), petalis cremeis (non vivide flavis) differt. **Typus:** Queensland. BURNETT DISTRICT: [5*] Mt Walla, Walla Range, 5 km SW of Coalstoun Lakes, 13 September 2002, *P.I. Forster* PIF28831 (holo: BRI [2 sheets + spirit]); iso: A, AD, DNA, HO, L, MEL, MO, NE, NSW, NY, WELT, Z distribuendi)

Phebalium squamulosum subsp. *squamulosum* auct. non Vent. pro parte (Wilson 1970; Forster 1997, 2002; Forster *et al.* 1991).

Small tree (rarely a shrub) up to 8 m high, up to 15 cm dbh, bark rough-flaky, grey; blaze cream-

yellow with strong aromatic scent; wood yellow. Indumentum (unless otherwise stated) on foliage and reproductive parts of overlapping lepidote trichomes that are silver to ferruginous-silver giving the covered surface this colour. Branchlets sparsely glandular-tuberculate, with a dense covering of trichomes, glabrescent. Leaves petiolate, strongly aromatic when crushed; petioles 1.7–3 mm long, 0.5–0.8 mm wide, with a sunken midrib and with dense trichomes; lamina chartaceous, linear, 14–62 mm long, 1.5–4.5 mm wide (length/width ratio 7.7–15.5); margins entire or somewhat sinuate to minutely crenate near apex, recurved; adaxial surface with sunken midrib, glossy dark-green, sparsely glandular, glabrous; abaxial surface with strongly raised midrib, densely covered in trichomes; tip apiculate to shortly acuminate; base attenuate. Inflorescences pedunculate, terminal umbels. Flowers 4–4.5 mm long, 3–4 mm wide; pedicels 4–5 mm long, c. 0.5 mm diameter, with dense trichomes; mature bud shape turbinate; calyx shortly subturbinate, 0.8–1 mm long, 1.7–1.8 mm diameter, adaxially glabrous, abaxially strongly glandular-tuberculate and with sparse trichomes, lobes broadly triangular, c. 0.3 mm long and 0.8 mm wide, irregularly dentate; petals elliptic, 3–3.2 mm long, 1–1.8 mm wide, adaxially glabrous, cream, abaxially with dense trichomes apart from c. 0.2 mm around margin that is devoid of trichomes; stamens 10, filaments 3.5–5 mm long, c. 0.1 mm diameter, filiform, glabrous, anthers oblong, 0.7–0.8 mm long, 0.4–0.5 mm wide; ovary spherical, c. 1 mm high, with dense trichomes; style 3–3.2 mm long, c. 0.3 mm diameter, with scattered multifid stellate trichomes in lower half, stigma capitate, papillate, c. 0.2 mm long and 0.3 mm wide. Cocci erect, 3.5–4 mm long, 2.5–3 mm wide, glandular, truncate at suture. Seed somewhat reniform, longitudinally compressed, 2.2–2.5 mm long, 1.3–1.5 mm wide, longitudinally corrugate, grey-black. **Fig. 1.**

Additional specimens examined: Queensland. BURNETT DISTRICT: [1*] Spencers Road, 7 km E of Wooroolin, Sep 2002, *Forster* PIF28870 & *Smyrell* (BRI, MEL); [2*] Klass & Townes Road, 3.5 km SE of Memerambi, Sep 2002, *Forster* PIF28873 & *Smyrell* (BRI, MEL, NE, NSW); [3*] Kingaroy Heights Park & Environmental Area, 3 km SE of Kingaroy, Dec 2002, *Forster* PIF29129 & *Smyrell* (BRI); [4*] Couchmans road, 5 km N of Kingaroy, Dec 2002, *Forster* PIF29137 & *Smyrell* (BRI); Kingaroy, Mar 1933, *Lang* [AQ152703] (BRI); [5*] 3 km SW of

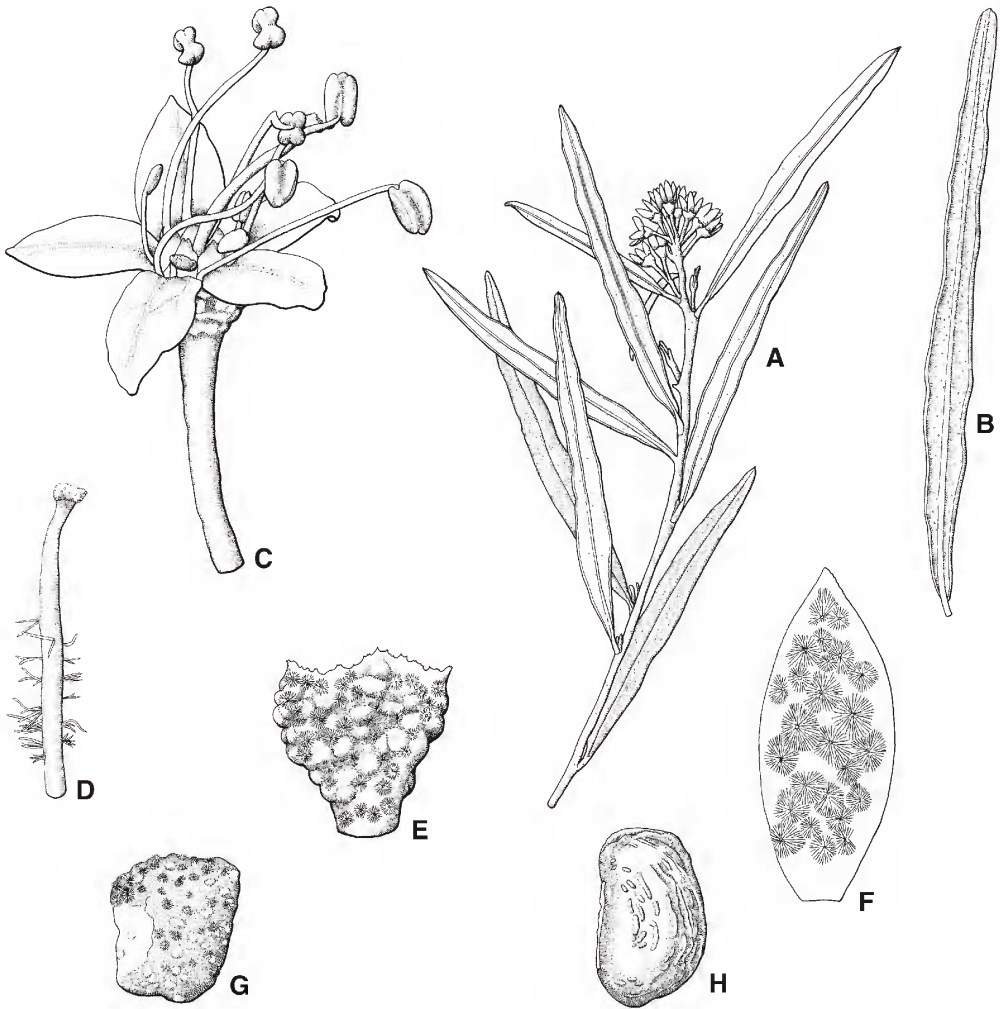


Fig. 1. *Phebalium distans*. A. flowering stem. $\times 1$. B. undersurface of leaf showing recurved margin. $\times 1.5$. C. flower. $\times 12$. D. style. $\times 12$. E. calyx showing markedly glandular-tuberculate surface and sparse covering of lepidote trichomes. $\times 12$. F. external view of petal. $\times 12$. G. coccus. $\times 6$. H. lateral view of seed. $\times 12$. A from Leiper (AQ678817) (BRI); B, F–H from Forster PIF24927 (BRI); C–E from Forster PIF28831 (BRI). Del. W. Smith.

Coalstoun Lakes, Walla Range, Aug 1990, *Randall* 613 (BRI); between Kingaroy & Memerambi, Mar 1986, *Schilling* [AQ399826] (BRI); Wooroolin, *s.dat.* [? Apr 1914], *Simmonds* [AQ152702] (BRI); [5*] Coalstoun Lakes, Biggenden, Jun 1994, *Thomas & Sinclair* [AQ636504] (BRI). MORETON DISTRICT: [6*] Scanlon Scrub, Mt Berryman area, Aug 1990, *Bird & Orford* [AQ473152] (AD, BISH, BRI, CANB, DNA, MEL, MO, NSW, PERTH); [6*] Mt Berryman area, 20 km S of Laidley, Dick Scanlon Scrub near Neumanns Lookout, Nov 1991, *Bird* [AQ590868] (BRI); [7*] Berlin Road, Mt Berryman area, 15 km SW of Laidley, Mar 1992, *Bird* [AQ541907] (BRI; CANB, PERTH n.v.); [8*] 1.5 km E of Mt Berryman, 10 km SSW of Laidley, Aug 1985, *Forster* PIF2109 & *Bird* (BRI); [7*] Welk Remnant, Mt Berryman, Sep 1999, *Forster* PIF24927 & *Booth* (AD, BRI, MEL, QRS); ditto loc., May 2002, *Forster* PIF28697 & *Endress* (A, BRI, L, MEL, NE, NSW, Z); ditto loc., Sep 1999, *Leiper* [AQ678817] (BRI, MEL, NSW).

* extant vouchered populations numbered 1–8, different collectors have named these sites in various ways.

Notes: *Phebalium distans* was first collected by J.H. Simmonds near Kingaroy, probably in April 1914, as all other collections by him from the Burnett were in this month. Until recently, further collections of this species have been spasmodically added to the herbarium record, mainly from the Mt Berryman area in the Lockyer Valley.

This species was included in the broad concept of *P. squamulosum* advocated by Wilson (1970). The collections by Lang and Simmonds were examined by Paul Wilson in 1965 and he noted on the determinant slips (as *P. squamulosum* var. *squamulosum*) that they were “approaching var. *longifolium*”.

Although individuals of *P. distans* may be initially shrublike, they will eventually form small trees up to 8 m high with a stem up to 15 cm dbh. This tree habit is quite unique in the genus *Phebalium*. The flowers of *P. distans* are always cream (ageing cream-fawn). It is always found in semi-evergreen vine thicket on red volcanic soils or communities adjacent to this vegetation type. It would appear to be allied to both *P. squamulosum* and *P. longifolium* but cannot be considered as intermediate between the two.

In comparison *P. squamulosum* subsp. *squamulosum* is a small shrub (never a tree), with narrow oblanceolate to narrow elliptic leaf laminae (versus linear) with a length/width ratio

of 4.2–6.6 (versus 7.7–15.5) with a flat margin (versus recurved) and the flowers are vivid yellow. Some collections identified and distributed as *P. squamulosum* subsp. *squamulosum* from the Dorrigo area in northern New South Wales (the oblanceolate-leaved form illustrated in Weston & Porteners (1991)) have cream flowers and a mixture of lepidote trichomes and stellate trichomes on the foliage, whereas the forms at Mt Ballow (Border Ranges) and Girraween N.P. in Queensland only have lepidote trichomes. This variation in *P. squamulosum* subsp. *squamulosum* requires resolution, but is beyond the scope of the current paper. *Phebalium distans* has lepidote trichomes only on the foliage. In Queensland *Phebalium squamulosum* subsp. *squamulosum* has been found in heathland, shrubland or woodland in rocky areas based on adamellite, granite, rhyolite or trachyte substrates. Both *P. squamulosum* and *P. distans* have a calyx that is markedly glandular-tuberculate.

Phebalium longifolium is also a shrub, with branchlets that are not glandular-tuberculate. It has narrow-elliptic leaves with a length/width ratio of 5–7.2, leaf laminae margins with a flat edge, a calyx that is not markedly glandular-tuberculate and seeds that are 1.8–2 mm long x 1–1.3 mm wide (versus 2.2–2.5 x 1.3–1.5 mm). Both *P. distans* and *P. longifolium* have cream flowers.

The only other taxon in this complex that occurs in Queensland is *Phebalium squamulosum* subsp. *gracile*. This taxon is a small shrub (never a tree) with linear-oblong leaf laminae (versus linear) that are markedly shorter (5–25 mm long versus 14–62 mm) with a length/width ratio of 3–7.7 (versus 7.7–15.5) and yellow flowers with shorter petals (2–3 mm versus 3–3.2 mm long). Whether or not *P. squamulosum* subsp. *gracile* is worth recognition at specific level requires further study, particularly in relation to the other proposed subspecies of *P. squamulosum* that occur in New South Wales (Wilson 1970). As an entity it is certainly quite distinct from *P. squamulosum* subsp. *squamulosum*, *P. distans* and *P. longifolium*.

Distribution and habitat: *Phebalium distans* is currently known from ten populations, with

two of these unvouchered (*viz.* Forster *et al.* 1991). Five of these are in close proximity to one another at Mt Berryman. Four are near Kingaroy, and the tenth most northerly one at Mt Walla, is near Coalstoun Lakes. All except the Mt Walla population, are on red volcanic soils with semi-evergreen vine thicket. At Mt Walla *P. distans* occurs in semi-evergreen vine thicket, but the soil varies from red volcanic where the population is at the base of the mountain to rubble derived from rhyolitic ignimbrite at the most elevated parts of the population.

Conservation status: *Phebalium distans* is considered to be *endangered in habitat* for several reasons. Firstly less than 1000 individuals are known to exist with the extant populations having the following estimated number of plants (population number cited above: number of plants estimated/area of remnant in ha) (1: 7/<0.5; 2: 3/<0.5; 3: 14/<0.5; 4: 20/<0.5; 5: <200/2; 6: <200/30; 7: <100/2; 8: <50/4). Several additional, but unvouchered localities in the Mt Berryman area (Sites 174 & 178 in Forster *et al.* 1991) have an unknown number of plants, however the small sizes of the remnants (5 & 3 ha respectively) means they are unlikely to harbour a large number of individuals.

Most of the suitable habitat for this species in the Coalstoun Lakes, Kingaroy and Lockyer valley areas was cleared for agriculture in the 20th century. Intensive survey of vine thicket and vineforest remnants in these three areas has been conducted since the mid 1980's (*viz.* Forster *et al.* 1991; Forster unpubl., W.J.F.McDonald unpubl.) and major populations of *P. distans* cannot be considered to have been overlooked throughout its known range. Recent intensive survey (2002) of roadside remnants in the Kingaroy Shire revealed a further three populations (populations 1, 2, 4). Population 1, 2 and 4 are in small roadside remnants and the other populations are in more secure remnants (e.g. Welk Remnant – population 7), freehold land (populations 5, 6, 8) or on shire council land with no active management strategies (population 3). The large population 5 at Walla Range (which co-occurs with the Endangered *Pomaderris clivicola* E.M.Ross) has significant

intrusions through the stand of naturalised pasture grasses such as *Panicum maximum* and environmental weeds such as *Lantana camara* that will act as a fire wick on the steep slope.

As with all *Phebalium* species, *P. distans* has small seed that are shed locally from the capsular fruit with little apparent long-range dispersal ability. The disjunct occurrence of this species in south-eastern Queensland suggests *P. distans* was much more widespread in the past, but is currently restricted due to the loss of suitable habitat.

Under the IUCN (2001) risk categories, *P. distans* may be categorised as Endangered under the criteria of B 1a, b (i, ii, iii, iv, v), 2b (i, ii, iii, iv, v), C 2a (i).

Etymology: The specific epithet is derived from the Latin *distans* (scattered) and refers to the scattered extant populations of this species.

Phebalium longifolium S.T.Blake, Proc. Roy. Soc. Queensland 70: 44 (1959). **Type:** Queensland. NORTH KENNEDY DISTRICT: About W of Ingham, near Wallaman Falls, 14 August 1954, S.T. Blake 18809 (holo: BRI[AQ318496]).

Shrub to 3 m high. Indumentum (unless otherwise stated) on foliage and reproductive parts of overlapping lepidote trichomes that are golden-ferruginous to silver-ferruginous, giving the covered surface this colour. Branchlets not glandular-tuberculate, with a dense covering of trichomes, glabrescent. Leaves petiolate, aromatic when crushed; petioles 1.7–3 mm long, 0.7–0.8 mm wide, with a sunken midrib and with dense trichomes; lamina chartaceous, narrow-elliptic to narrow-oblongate, 15–80 mm long, 2.5–10 mm wide (length/width ratio 5–7.2); margins entire or somewhat sinuate to minutely dentate for entire length, thickened, flat; adaxial surface with sunken midrib, glossy dark-green, glabrous or sometimes with sparse trichomes on margin, sparsely glandular-tuberculate; abaxial surface with prominently raised midrib, densely covered in trichomes; tip acute; base attenuate. Inflorescences pedunculate, terminal umbels. Flowers 4–5.5 mm long, 4–6 mm diameter; pedicels 5–12 mm long, 0.5–0.8 mm diameter, with dense trichomes; mature bud shape turbinate; calyx shortly subturbinate, 0.7–

1.4 mm long, 2.2–3 mm diameter, adaxially glabrous, abaxially with dense trichomes, not glandular-tuberculate or only weakly so, lobes broadly triangular, 0.3–0.5 mm long, 1–1.2 mm wide, irregularly dentate; petals elliptic, 3–3.2 mm long, 1.5–1.8 mm wide, adaxially glabrous, cream, abaxially with dense trichomes apart from c. 0.2 mm margin that is devoid of trichomes; stamens 10, filaments 3–5 mm long, c. 0.1 mm diameter, filiform, glabrous; anthers oblong, 0.7–1 mm long, 0.4–0.5 mm wide; ovary spherical, c. 1 mm high, with dense trichomes; style 2.8–3.3 mm long, 0.1–0.2 mm diameter, with scattered multifid stellate trichomes in lower half, stigma capitate, papillate, c. 0.2 mm long and 0.3 mm wide. Cocci erect, 3–3.5 mm long, 2.2–2.6 mm wide, truncate at suture. Seeds somewhat reniform, longitudinally compressed, 1.8–2.2 mm long, 1–1.3 mm wide, longitudinally corrugate, grey-black. **Fig. 2.**

Selected specimens examined: Queensland. COOK DISTRICT: Longlands Gap, S.F. 194, Jun 1995, *Forster* PIF16776 (BRI, MEL, QRS); ditto loc., Sep 2001, *Forster* PIF27518 *et al.* (A, BRI, K, L, MEL); S.F. 194 Mt Baldy, Oct 1999, *Forster* PIF25088 & *Booth* (AD, BRI, MEL, QRS); Herberton Range S.F., Apr 1998, *Jago* 4720 (BRI). NORTH KENNEDY DISTRICT: Bluewater S.F., 55 km NW of Townsville, Nov 1991, *Bean* 3790

(BRI; BISH, CANB *n.v.*); Birthday Falls, Paluma Range, Sep 1966, *Birch* [AQ152608] (BRI); W side of Paluma – Hidden Valley road, c. 10 km W of Paluma, Jul 1992, *Jobson* 1730 *et al.* (BRI; MEL, NSW *n.v.*); S.F. 344, c. 27 km W of Kennedy township, May 1976, *Thorsborne* 218 (BRI).

Distribution and habitat: *Phebalium longifolium* is endemic to the “Wet Tropics” of north-eastern Queensland in several disjunct populations from the Herberton Range in the north to Paluma in the south. It inhabits the edges of wet rainforest in the ecotone to adjacent eucalypt open forest, usually on basalt or metamorphic substrates.

Notes: This species is easily distinguished from *P. squamulosum* by the long narrow-elliptic leaf laminae with an attenuate base (versus cuneate), the cream flowers (versus yellow) with a non-glandular-tuberculate (or only weakly so) calyx and with narrower petals (1.5–1.8 mm wide versus 1.8–2 mm wide).

Conservation status: *Phebalium longifolium* is well represented in State Forests (S.F. 194, 268, 344) and National Parks (Mt Spec) throughout its range and is not considered threatened.

Key to the species of *Phebalium* found in Queensland. N.B. *P. distans* is usually a tree, but is also keyed out as a shrub for encounters with small individuals of this species.

- 1. Flowers large with petals 4.5–9 mm long 2
Flowers small with petals 2–4 mm long 4
- 2. Calyx with short lobes < 1 mm long; corolla yellow **P. whitei**
Calyx with well developed lobes 1–5 mm long; corolla white or pink 3
- 3. Calyx 5–6 mm diameter, cupular, 6–8 lobed; petals pink **P. nottii**
Calyx 2–3 mm diameter, obturbinate, 5-lobed; petals white or pink **P. woombye**
- 4. Tree **P. distans**
Shrub 5
- 5. Leaf lamina linear to oblong-cuneate 6
Leaf lamina narrow-elliptic to narrow-oblongate 8
- 6. Leaf margin undulate, markedly glandular **P. glandulosum**
Leaf margin entire or somewhat sinuate to minutely crenate near the apex, 7

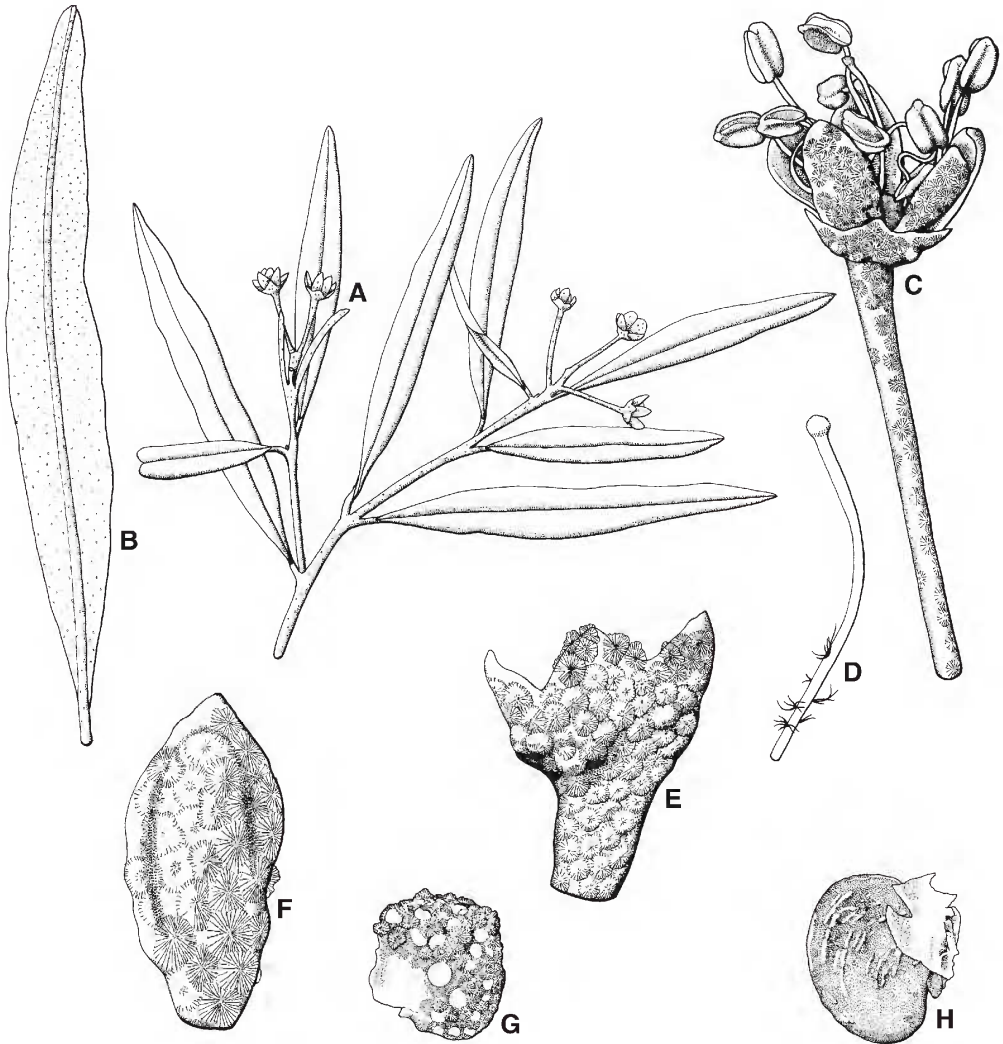


Fig. 2. *Phebalium longifolium*. A. flowering stem. $\times 1$. B. undersurface of leaf showing flat margin. $\times 1.5$. C. flower. $\times 6$. D. style. $\times 12$. E. calyx showing poor development of glandular-tuberculate surface and dense coverage of lepidote trichomes. $\times 12$. F. external view of petal. $\times 12$. G. coccus. $\times 6$. H. seed. $\times 12$. A, B, G, H from Forster PIF25088 (BRI); C–F from Jago 4720 (BRI). Del W. Smith.

7. Leaf lamina short, 5–25 mm long, with a length/width ratio of 3–7.7; corolla yellow, petals 2–3 mm long **P. squamulosum** subsp. **gracile**
 Leaf lamina long, 14–62 mm long, with a length/width ratio 7.7–15.5; corolla cream, petals 3–3.2 mm long **P. distans**
8. Leaf lamina with a cuneate base; corolla yellow, petals 1.8–2 mm wide **P. squamulosum** subsp. **squamulosum**
 Leaf lamina with an attenuate base; corolla cream, petals 1.5–1.8 mm wide **P. longifolium**

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References

- BRUYN, P.V. (2002). Monograph of *Orbea* and *Ballyanthus* (Apocynaceae – Asclepiadoideae – Ceropegieae). *Systematic Botany Monographs* 63: 1–196.
- FORSTER, P.I. (1997). Rutaceae. In R.J.F. Henderson (ed.), *Queensland Plants Names and Distribution*, pp. 184–188. Brisbane: Department of Environment.
- (2002). Rutaceae. In R.J.F. Henderson (ed.), *Names and Distribution of Queensland Plants, Algae and Lichens*, pp. 177–181. Brisbane: Environmental Protection Agency.
- FORSTER, P.I., BOSTOCK, P.D., BIRD, L.H. & BEAN, A.R. (1991). *Vineforest Plant Atlas for South-east Queensland*. Brisbane: Queensland Herbarium.
- IUCN (2001). *IUCN Red List Categories and Criteria. Version 3.1*. Gland: IUCN – The World Conservation Union.
- JUDD, W.S., CAMPBELL, C.S., KELLOGG, E.A., STEVENS, P.F. & DONOGHUE, M.J. (2002). *Plant Systematics – a phylogenetic approach*. 2nd ed. Sunderland, Massachusetts: Sinauer Associates Inc.
- ROSS, E.M. (1983). Rutaceae. In T.D. Stanley & E.M. Ross, *Flora of South-eastern Queensland*. 1: 440–470. Brisbane: Queensland Department of Primary Industries.
- (1994). Rutaceae. In R.J.F. Henderson (ed.), *Queensland Vascular Plants Names and Distribution*, pp. 301–308. Brisbane: Queensland Department of Environment & Heritage.
- STACE, C.A. (1989). *Plant Taxonomy and Biosystematics*. 2nd edition. London, Melbourne, Auckland: Edward Arnold.
- STEBBINS, G.L. (1950). *Variation and evolution in plants*. New York: Columbia University Press.
- WESTON, P.H. & PORTENERS, M.F. (1991). *Phebalium*. In G.J. Harden (ed.), *Flora of New South Wales* 2: 25–263. Kensington: University of New South Wales Press.
- WILSON, P.G. (1970). A taxonomic revision of the genera *Crowea*, *Eriostemon* and *Phebalium*. *Nuytsia* 1: 5–155.
- (1998). New species and nomenclatural changes in *Phebalium* and related genera (Rutaceae). *Nuytsia* 12: 267–288.